# **Identifying Research Opportunities at NINR: A Case in Point**

NINR has utilized several methods to identify research opportunities for new and rapidly evolving areas of science which compel a systematic response from the nursing research community. NINR's Strategic Plan (http://www.nih.gov/ninr/strategicplan.htm) was crafted in part using these methods. Workshops are one means by which research areas can be mapped. In the recent past, NINR has convened workshops on transplantation, genetics, end of life research, and now, emerging infections.

The following summary is from the workshop panel on "Emerging Infections: Control Through Behavioral Interventions," which was convened by NINR in June 1999. The workshop provided important recommendations for the nursing research community based on the current state of the science in this area.

#### RESEARCH OPPORTUNITIES FOR CONTROLLING EMERGING INFECTIONS

The National Institute of Nursing Research (NINR) convened twelve scientists and clinicians with expertise in infection control, health education and behavioral change in Rockville, Maryland, on June 3-4, 1999, to identify research gaps and opportunities to inform the research agenda in the area of emerging infections.

Infectious disease, thought just two decades ago to be nearly eradicated in this country, was the third leading cause of death in the United States in 1992<sup>1</sup>. The leading causes of death in the United States in 1996 included pneumonia as the sixth leading cause of death and HIV/AIDS as the eighth.<sup>2</sup> Experts predict that emerging infectious diseases (EIDs) caused by both new and reemerging pathogens will increase in significance as a public health issue in the future. The country's vulnerability to infection is heightened by the growth in populations at particular risk—e.g., the elderly, people with impaired immune systems or other chronic illnesses, and refugees and other immigrants. To these challenges is added the impact of managed care, with its shorter hospital stays and shift from acute care to a wide range of health care and community settings.

Increasing drug resistance cuts across and compounds all these issues, as therapies that once were standard for infections become largely ineffective. The striking result is that trends in U.S. mortality data over the last century show no change in the slope following the introduction of antibiotics. (See Figure 1.3)

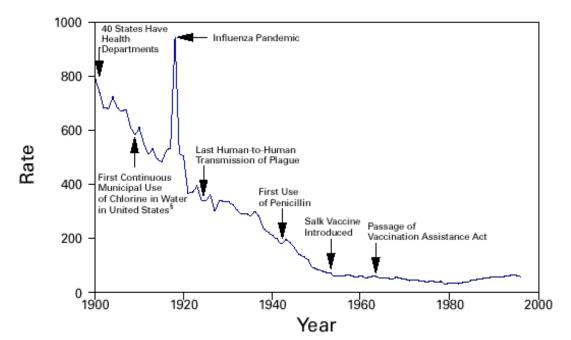


FIGURE 1. Crude death rate\* for infectious diseases — United States, 1900-1996†

\*Per 100,000 population per year.

## **How Can Nursing Research Contribute?**

Current research on infectious disease encompasses ecologic and environmental factors, microbial changes and adaptations, human susceptibility, and control and prevention strategies. Many of the gaps in research lie in the area of applied behavioral research, especially within settings other than acute care, including homes and community institutions (schools, recreation sites, prisons, daycare centers, and so on). Not enough is known about what interventions work in non-acute care settings, nor about why interventions shown to be efficacious in controlling infection often prove ineffective when applied under less controlled conditions.<sup>4</sup>

These issues fall within the broad domain of nursing practice and relate to a key component of the NINR mission, "to prevent or delay the onset of disease and disability." Thus, the Institute has recognized an opportunity to address these issues with a particular focus on prevention through behavioral interventions, and it is committed to developing a research agenda in this area.

For its June 1999 meeting, the NINR put together an interdisciplinary team that included academics, researchers, agency administrators, and community public health workers. In addition to nursing, their disciplines included microbiology, medicine, public health, and food safety. (The members are listed at the end of this report.)

<sup>&</sup>lt;sup>†</sup>Adapted from Armstrong GL, Conn LA, Pinner RW. Trends in infectious disease mortality in the United States during the 20th century. JAMA 1999:281;61–6.

<sup>§</sup>American Water Works Association. Water chlorination principles and practices: AWWA manual M20. Denver, Colorado: American Water Works Association, 1973.

### The June 3-4 1999 Meeting: Themes and Conclusions

The two-day discussion was wide-ranging and productive. As the organizers had hoped, the diversity of the group led naturally to a broad approach to the subject matter. The members examined the *settings* and *populations* for targeted efforts, the *key EID "actors,"* and the *possible types of interventions*.

Although hospitals remain a major site of infection and infection control activities, much of health care and prevention activities today occur not in the hospital but in nursing homes, ambulatory centers and private homes. Moreover, many individuals with chronic conditions participate in community life (e.g., special-needs children in public schools), where the potential for transmission of infections must be addressed. The work group took these varied settings into consideration, recognizing that the battle against emerging infections is moving not just beyond the hospital but beyond traditional health care approaches. Surveillance and control efforts are focusing on public places such as swimming pools and agricultural worksites as well as on individual homes, particularly around issues of food and water safety.

Ultimately, even as the scope is widening it is also narrowing to focus on the individual and on ways persons can participate in preventing infections. Members agreed that a broad educational effort to change behavior—for example, to improve handwashing practices—must target the young and be expected to take a generation to bring about the desired changes at the societal level.

The work group recommended including those with expertise beyond traditional health care, such as architects and urban planners, on interdisciplinary teams to reduce infections. They recognized that technologic innovations are an important part of the solution, and also called for international alliances, since pathogens know no boundaries and important research is taking place in other parts of the world.

Three types of interventions were identified, representing three areas of innovation:

- behavioral/educational (e.g., school-based educational programs to improve handwashing practices)
- engineering and technological (e.g., strategic location of automated sinks)
- organizational/contextual (e.g., nursing home policy to promote vancomycin-resistant enterococci [VRE] monitoring and surveillance)

In addition, participants discussed the need to consider such factors as age, socioeconomic status (SES), culture, and race/ethnicity as well as beliefs and customs in designing and evaluating interventions. (See Table 1)

### Table 1. Examples of population groups for study of interventions to reduce/prevent EID

- Age groups (e.g., infants, school-age children, adolescents, childbearing-age women, seniors)
- SES groups (especially people with low incomes)
- Racial and ethnic groups; language groups; recent immigrants
- Rural/urban residents
- Health care workers with special characteristics (e.g., pregnant, immune-compromised)
- Other groups of workers (e.g., meat packers, migrant workers)

The workshop panel concluded that nursing research should be aimed at 1) characterizing risks, 2) understanding relevant beliefs and practices, 3) testing efficacious interventions in new settings, and 4) enhancing the effectiveness of interventions with demonstrated efficacy. In each context, work group members stressed the importance of looking at diverse settings and populations and testing a range of interventions. Their recommended areas of scientific opportunity on EID follow, with a few examples in each category.

### **Recommendations for Nursing Research**

- 1. Characterize infectious disease risks
- in various settings (home, school, outpatient, etc.)
- in various populations (across life span, different ethnic/cultural/religious groups, etc.)

### Examples of research ideas in this category:

- Describe the relationship between host and social factors (e.g., culture, SES, religious practices, age, skin integrity, nutrition, genetics) and risk of infection.
- Examine the relationship between foreign bodies such as bladder catheterizations and gastrostromy tubes, especially in nursing home patients, and acquisition of resident bacteria.
- Describe the risk that care providers of persons positive for resistant organisms will acquire infections or become colonized with resistant strains while working in home or community settings. Evaluate transient vs. resident changes in flora.
- Quantitate risks of infectious disease transmission within various settings (child care, schools, long-term care, homes).
- Examine the relationship between SES (and other social, cultural or behavioral factors) and the prevalence of multidrug-resistant organisms or other emerging pathogens in populations.
- 2. Describe beliefs and practices related to infection prevention and control
  - in various settings (home, school, outpatient, etc.)
  - in various populations (across life span, different ethnic/cultural/religious groups.

#### Examples of research ideas in this category:

- Describe the health beliefs, cultural practices, traditional folk medical practices of immigrant populations related to the detection, treatment, and transmission of infectious disease across the life span.
- Evaluate the views of childcare workers and children in daycare about hygiene and handwashing.
- Assess the impact of cultural/ethnic/rural-urban beliefs and practices on antibiotic use and infectious disease in relation to transmission, immunization, etc.
- 3. Transfer and test in home and community settings those interventions with demonstrated efficacy in the acute care setting (e.g., hand hygiene, use of vaccines, antibiotic use and prescribing patterns, use of disinfection and cleaning).

### Examples of research ideas in this category:

- Evaluate the antibiotic prescribing practices of healthcare professionals and interventions that result in more appropriate practice.
- Assess the nature of handwashing in home and childcare settings —how and why people wash their hands—and the relationship between hygienic practices and reductions in the risk of infections caused by pathogens that are transient on the hands.
- Assess and characterize the barriers to effective implementation of standard infection control practices at the organizational (e.g., administrative) level in the hospital and non-hospital health care setting.
- 4. Promote the effectiveness of prevention and control practices (e.g., improving hand hygiene and use of barrier precautions) by testing different types of innovations (behavioral/educational, engineering/technological, and organizational/contextual innovations).

Examples of research ideas in this category:

- Develop and test the effects of technologic innovations (e.g., architectural and design modifications, physical or chemical barriers) on transmission of infections in various settings home, preschool, school, hospital, clinic.
- Test different models of behavior change for effectiveness in lowering risks for emerging infectious diseases.

#### **Other Recommendations**

- Create partnerships that encourage innovations or applications of engineering and technological advances to reduce transmission of infectious agents.
- Collaborate with other agencies (e.g., Centers for Disease Control and Prevention, National Institute of Allergy and Infectious Disease, National Institute of Mental Health) to identify and test promising infection prevention and control strategies.
- Collaborate with other professional groups (e.g. urban planners, architects, media, specialists in agriculture) to identify and test promising infection prevention and control strategies.
- Develop research training opportunities to improve the quality and clinical outcomes of nursing research in EID.

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#### **Notes**

- 1 Department of Health and Human Services. Overview, Immunization and infectious diseases. Healthy People 2010 Objectives, 1999 draft for public comment.
- 2 Centers for Disease Control and Prevention. National Vital Statistics Report, 47:9, November 10, 1998.
- 3 Morbidity and Mortality Weekly Report 1999; 48: 621.
- 4 Kretzer EK, Larson EL. Behavioral interventions to improve infection control practice. American Journal of Infection Control 1998; 26: 245-253.

For more information about NINR extramural research: http://www.nih.gov/ninr/research.htm

For the long report of the workshop: http://www.nih.gov/ninr/Conf.htm